

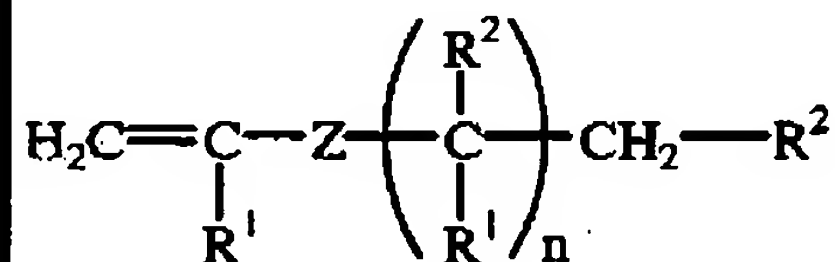
Serial No. 10/607,012

Response to Office Action of June 1, 2005

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A water-insoluble interpenetrating polymer network comprising:

a first polymer derived from a monomer having the general structure



where R^1 is independently in each occurrence H, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ hydroxy alkyl, Cl or Br; Z is a nullity, O, $\text{C}(\text{O})\text{NR}^3$ or $\text{C}(\text{O})$; R^2 is independently in each occurrence H, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ hydroxy alkyl, $\text{C}_0\text{-C}_4$ SO_3M or $\text{C}_0\text{-C}_4$ PO_2H_2 ; R^3 is H, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ hydroxy alkyl, where M is H, Li, Na, K, Zn, Mg, Ca, Ba, Sr, Cs and Al; n is an integer from 1 to 5, inclusive, with the proviso that adjacent carbon atoms lack sulfonic and/or phosphonic acid groups and at least one sulfonic acid or phosphonic acid group is present in the structure;

a second monomer copolymerized with said monomer to impart water insolubility to said first polymer; and

a second polymer polymerized independently of said first polymer and interpenetrating said first polymer wherein said second polymer is more permeable to water than methanol.

2. (Original) The interpenetrating polymer network of claim 1 wherein said monomer has a sulfonic acid group.

3. (Original) The interpenetrating polymer network of claim 1 wherein Z is $\text{C}(\text{O})\text{NR}^3$.

Serial No. 10/607,012

Response to Office Action of June 1, 2005

4. (Original) The interpenetrating polymer network of claim 1 wherein said monomer has only a single sulfonic acid or phosphonic acid group.

5. (Original) The interpenetrating polymer network of claim 1 wherein said monomer is selected from a group consisting of: 2-acrylamido-2-methyl propane sulfonic acid, acryl ethane sulfonic acid, methacryl ethane phosphonic acid, 2-methacrylamido-N-ethyl sulfonic acid, and methacryl-2-hydroxyethane sulfonic acid.

6. (Original) The interpenetrating polymer network of claim 1 wherein said monomer is 2-acrylamido-2-methyl propane sulfonic acid.

7. (Original) The interpenetrating polymer network of claim 1 wherein said first polymer is present from 2 to 40 total weight percent.

8. (Canceled)

9. (Currently Amended) The interpenetrating polymer network of claim [[8]] 1 wherein said ~~copolymer~~ second monomer is selected from a group consisting of: 2-hydroxy ethyl methacrylate, hydroxypropyl methacrylate, 4-hydroxybutyl methacrylate, 2-hydroxyethyl acrylate, 2-hydroxypropyl acrylate, methyl methacrylate, N-t-butylacrylamide, N,N'-dimethylacrylamide, (vinyl)sulfonic acid, styrene, styrenesulfonic acid, as well as many other acrylamides, acrylates, hydroxyalkyl acrylates and methacrylates.

Serial No. 10/607,012
Response to Office Action of June 1, 2005

10. (Currently Amended) The interpenetrating polymer network of claim ~~[[8]]~~ 1 wherein said ~~copolymer~~ second monomer is present from 20 to 75 total weight percent.

11. (Currently Amended) The interpenetrating polymer network of claim ~~[[8]]~~ 1 wherein said monomer is present at a lesser weight percent than said ~~copolymer~~ second monomer.

12. (Currently Amended) The interpenetrating polymer network of claim ~~[[8]]~~ 1 further comprising a cross-linking agent.

13. (Currently Amended) The interpenetrating polymer network according to claim ~~[[8]]~~ 1 further comprising a polymerization initiator.

14. (Original) The interpenetrating polymer network of claim 12 wherein said cross-linking agent is selected from a group consisting of: ethylene glycol dimethacrylate (EGDM), ethylene glycol diacrylate, tetraethylene glycol diacrylate, tetraethylene glycol dimethacrylate, poly(ethylene glycol) diacrylate, poly(ethylene glycol) monomethacrylate, propylene glycol diglycidyl ether, N, N'-methylene-bis-acrylamide, 3,3-tetramethyleneglutaric acid.

15. (Original) The interpenetrating polymer network of claim 1 wherein said second polymer is polyvinyl alcohol.

Serial No. 10/607,012

Response to Office Action of June 1, 2005

16. (Original) The interpenetrating polymer network of claim 15 further comprising a condensation reaction cross-linking agent.

17. (Original) The interpenetrating polymer network of claim 16 wherein said polyvinyl alcohol is uniformly cross-linked.

18. (Original) The interpenetrating polymer network of claim 16 wherein a cross-link density gradient exists within said polyvinyl alcohol.

19. (Original) The interpenetrating polymer network of claim 1 further comprising a filler selected from the group consisting of: inorganic salt hydrates, silica particulate, metal sols, metal nanocrystals, and semiconductor nanocrystals.

20. (Original) A film produced from an interpenetrating polymer network of claim 1.

21. (Original) The film of claim 20 having proton conductivity and greater permeability to water than methanol.

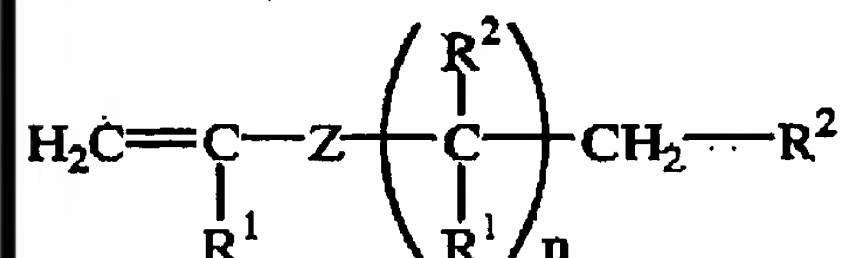
22. (Currently Amended) The film of claim 20 having a first surface in contact with an adherent selected from the group consisting of: a catalyst, ~~and~~ a specific binding moiety for a target analyte, and a ~~or~~ recognition moiety for a target analyte.

23-28 (Canceled)

Serial No. 10/607,012

Response to Office Action of June 1, 2005

29. (New) A water-insoluble interpenetrating polymer network comprising:
a first polymer derived from a monomer having the general structure



where R^1 is independently in each occurrence H, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ hydroxy alkyl, Cl or Br; Z is a nullity, O, $\text{C}(\text{O})\text{NR}^3$ or $\text{C}(\text{O})$; R^2 is independently in each occurrence H, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ hydroxy alkyl, $\text{C}_0\text{-C}_4 \text{SO}_3\text{M}$ or $\text{C}_0\text{-C}_4 \text{PO}_2\text{H}_2$; R^3 is H, $\text{C}_1\text{-C}_4$ alkyl, $\text{C}_1\text{-C}_4$ hydroxy alkyl, where M is H, Li, Na, K, Zn, Mg, Ca, Ba, Sr, Cs and Al; n is an integer from 1 to 5, inclusive, with the proviso that adjacent carbon atoms lack sulfonic and/or phosphonic acid groups and at least one sulfonic acid or phosphonic acid group is present in the structure; and

a second polymer polymerized independently of said first polymer and interpenetrating said first polymer wherein said second polymer is more permeable to water than methanol;

wherein said first polymer is present from 2 to 40 total weight percent.

30. (New) The interpenetrating polymer network of claim 29 wherein said monomer has only a single sulfonic acid or phosphonic acid group.

31. (New) The interpenetrating polymer network of claim 29 wherein said monomer is selected from a group consisting of: 2-acrylamido-2-methyl propane sulfonic acid, acryl ethane sulfonic acid, methacryl ethane phosphonic acid, 2-methacrylamido-N-ethyl sulfonic acid, and methacryl-2-hydroxyethane sulfonic acid.

Serial No. 10/607,012
Response to Office Action of June 1, 2005

32. (New) The interpenetrating polymer network of claim 29 wherein said second polymer is polyvinyl alcohol.

33. (New) The interpenetrating polymer network of claim 32 further comprising a condensation reaction cross-linking agent.

34. (New) The interpenetrating polymer network of claim 29 further comprising a filler selected from the group consisting of: inorganic salt hydrates, silica particulate, metal sols, metal nanocrystals, and semiconductor nanocrystals.